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ABSTRACT

In 1987, a school-university collaborative project, Positive Attitudes in Tennessee Schools (PATS), was established to improve school-learning environments. This paper presents findings of a study that investigated the effect of school participation in PATS on school climate. A secondary focus was to determine which school-climate variables could predict differences between experienced and beginning PATS schools. Data were derived from the administration of the Tennessee School Climate Inventory (TSCI) to teachers at 92 Tennessee schools--51 elementary, 21 middle, and 20 senior high schools. No significant differences were found to exist between experienced and beginning schools. Elementary schools demonstrated more instructional improvement than did middle and senior high schools, regardless of project experience. TSCI dimensions of school climate were poor predictors of program experience level. Despite nonsignificant differences between experienced and beginner schools, overall net gains were observed for all dimensions. Data suggest that 61.5 percent of the schools could be expected to improve school-climate variables within 3 to 4 years and that only 38.5 percent could be expected to improve such variables within one year. A possible explanation for the apparent lack of significant improvement is the stability of the school-climate construct. (LMI)

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The Relationship Between School Climate, PATS Program Participation, and Organizational Level

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Abstract

The relationship between school climate, Positive Attitudes in Tennessee Schools (PATS) project participation, and organizational level was investigated. Seven dimensions of the *Tennessee School Climate Inventory* (*TSCI*) were utilized as dependent variables in a 2 X 2 MANCOVA design to assess the effects of PATS experience and school level. Additionally, a discriminant function analysis was performed to determine those variables which differentiated experienced from beginner schools. No significant effect was observed for the experience by organizational level interaction, nor was there a significant effect for program experience. There was a significant main effect for organizational level, and the *TSCI* Instruction dimension was significantly influenced by this effect. Elementary schools exhibited greater improvement in the area of Instruction than middle and senior high schools. Despite non-significant differences between experienced and beginner schools, overall net gains were observed for all dimensions. A derived disciminant function correctly classified 60.9% of schools as either experienced or beginner using three *TSCI* dimensions (Leadership, Environment, and Instruction), though this function was not statistically significant. The data suggest that 61.5% of schools would be expected to improve school climate variables over a three- to four-year period, while only 38.5% of schools would be expected to improve over a one-year period. The stability of the school climate construct was implicated as a possible explanation for the apparent lack of significant improvement as a function of program participation.

The Relationship Between School Climate, PATS Program Participation, and Organizational Level

In 1989 a school and university collaboration known as Positive Attitudes in Tennessee Schools (PATS; Pike & Chandler, 1989) was established to improve school learning environments. The collaboration involved school leadership teams, state department of education personnel, and university faculty cooperatively planning and implementing a school reform initiative designed for a five-year period. The program was initiated when the first training academy was held in the summer of 1989 for leadership teams representing 41 schools selected as Pilot sites. Initial learning environment audits were conducted in the fall semester of 1989. Subsequent audits were conducted in the Pilot sites in the spring semesters of 1990-1993. Additional schools became involved in the project in the following years: Cycle II (1990-1991), and Cycle III and Extended (1992-1993) sites. Overall, 169 schools have participated during the four years of the project, representing more than 11,000 faculty and staff respondents.

Conceptual Framework for the School Improvement Project

The use of data-based, or informed, decision making and planning as a strategy in school improvement initiatives emerged in recent years as a strategy for improving the performance of America's public schools (Ross & Mahlck, 1990; Wilson, Miller, & Rossman, 1985). The indicator system developed for PATS was grounded on the belief that school contextual information could be used effectively by school personnel to plan and implement school improvement activities that could enhance the quality of workplace environments for teaching and

learning environments for students (Butler & Alberg, 1993; David, 1987; Ross & Malck, 1990).

This research focused on the school as a unit. From a policy-making perspective, the school as a unit of change has become politically important in recent years (Heck & Mayor, 1993). Reform efforts such as school choice, school-based decision making, use of standards and accountability, along with efforts to study the characteristics of effective schools, are grounded on the belief that schools as organizational units can be altered and evaluated in terms of their effectiveness or productivity. Development of systems for profiling school contextual indicators is associated with this current policy perspective (Oakes, 1986, 1989). Strategies for generating contextual indicators as organizational attributes as they exist over time have been advocated by educational many reformers, researchers, and political leaders (Heck & Mayor, 1993; Porter, 1991; Rumberger & Willms, 1992).

One of the first steps involved in developing a system of collecting and reporting school context indicators necessitated a conceptual formulation of what is meant by a school's learning environment. In PATS, a learning environment is defined as a composite of school and classroom sociopsychological factors which influence student achievement, attitudes, and conceptions of self (Stockard & Mayberry, 1985). Data utilized as indicators of the quality of school organizational contexts were perceptual information from school professional personnel and students. Professional personnel were viewed as appropriate sources of information through which overall school climate or culture dimensions were constructed. Students were expected to provide class context data and perceptions of themselves

as learners. Three different inventories were developed to generate these measures.

Numerous organizational, social, cultural, personal, and physical factors influence school contexts (Anderson, 1982; Deal, 1993; Heck & Mayor, 1993; Purkey & Smith, 1983), yet many valued characteristics are often beyond current measurement technology (Oakes, 1989). The system of indicators used to generate data used in this report focused primarily on cultural aspects of schools: beliefs, values, relationships, and expectations believed to affect the quality of both teaching and learning (Deal, 1993).

The nature of the project also involved specifying a change strategy appropriate for accomplishing the goals of the school improvement initiative. Dissemination was selected as the change model to guide planning and implementation focusing on data-based school improvement. As a policy tool, the dissemination model relies heavily on the use of knowledge-based products by external agents in stimulating and supporting planned change at the school level (Firestone & Corbett, 1988).

Specific change features were based upon several key considerations:

1. Program products (instructional materials, data summaries) were to be non-threatening.
2. Leadership teams were to be trained to introduce the materials and activities to school faculties and coordinate project implementation in each site.
3. Overall management of the program was the responsibility of state department personnel who would provide technical assistance, coordinated training academies and workshops, and facilitate communication between the sites.
4. A host of school and community factors that both support and inhibit educational change were acknowledged.
5. Program implementation and results were linked to individual school leadership, resources, and press for change.
6. Innovative practices within the sites were anticipated as outcomes of the implementation process.
7. Successful results in the sites were to be disseminated to other sites through annual academies, regional workshops, and other communication strategies.

The change model utilized incorporates the recognition that organizational and environmental changes may depend upon modifications of the normative structures of schools that support or inhibit change and improvement. Thus, information collection and reporting strategies were designed to describe the normative structures of the participating schools at selected times and to explain, if possible, major changes and influential factors responsible for improvements realized.

An analysis of the 1989 baseline data was conducted and a summary prepared of empirical indicators reflecting the normative structures which directed teaching and learning in the Pilot schools during the fall semester of 1989 (Butler, 1990). Generalizations reported were based on aggregated state-wide data using elementary, junior high/middle schools, and senior highs schools as units for analysis. Various organizational context strengths and weaknesses reflected in the empirical indicators were noted. The report concluded with the following:

> Whether the realities of school learning environments measured during the fall of 1989 will be similar at later points in time is unknown. Data generated in the Spring of 1990, and in subsequent years, will be utilized in answering questions relative to changes and stability in patterns over time. School improvement plans being developed and implemented to produce changes in learning environments may indeed yield outcomes which differ from those observed in the baseline data. The organizational and behavioral patterns reflected in these data, however, may have consistency and stability difficult to modify (Butler, 1990, p. x).

The present study investigated the relationship between school climate, school organizational level, and PATS program participation. The intent was to determine if school climate dimensions remained stable in light of concerted efforts to improve them. In addition, the ability of school climate variables to discriminate between experienced and beginner PATS schools was investigated.

Method

School Sample

The ninety-two schools providing data for this research were those that had participated in a school climate audit during the Spring of 1993 and that had completed the designated baseline audit for a specific cohort. Characteristics of these schools are presented in Table 1. The 51 elementary schools represented 55.4% of the sample. The 21 middle and 20 senior high schools comprised 22.8% and 21.7%, respectively. Most schools were located in the eastern part of the state, though the middle and west regions were adequately represented. More than two-thirds of the schools served a rural or small town population; about one-third were urban or suburban. The number of teachers in each school ranged from 8 to 80, with elementary schools having the fewest and senior high schools having the most teachers on average. This school sample represents more than 6,000 respondents.

Materials

The *Tennessee School Climate Inventory* (*TSCI*; Butler & Alberg, 1991) is composed of seven scales, or dimensions, which are based on factors logically constructed from variables believed to be associated with effective schools and organizational climates (Anderson, 1982; Purkey & Smith, 1983; Walberg, 1987). Data from the *TSCI* and other instruments, collectively comprising the *Learning Environment Assessment System* (Butler & Alberg, 1990a), have been used to plan school improvement initiatives. The seven dimensions are: Order, Leadership, Environment, Involvement, Instruction, Expectations, and Collaboration. The inventory consists of 49 items (seven per dimension) which are rated using a five-point scale (1=strong agreement, 5=strong disagreement).

Table 1

Characteristics of the School Sample

Variable		School Level				
		Elementary (n = 51)	Middle (n = 21)	Senior High (n = 20)	Total (N = 92)	%
State Region	East	21	9	8	38	41.3
	Middle	17	7	4	28	30.4
	West	13	5	8	26	28.3
Community	Rural	19	6	7	32	34.8
	Small Town	18	7	6	31	33.7
	Urban	11	6	6	23	25.0
	Suburban	3	2	1	6	6.5
Number of Teachers	Mean	23.8	33.9	42.9	30.3	
	Range	8-55	19-49	10-80	8-80	

The range of scores is 7-35, with higher scores associated with more positive learning environments.

The concept of school climate used to develop the *TSCI* encompasses "norms, beliefs, and attitudes reflected in institutional patterns and practices that enhance or impede student achievement" (Wallich, 1981). The notion of climate is similar to that of "culture" which includes belief systems, values, general cognitive structures, and meanings that govern patterned relationships of persons and groups (Tagiuri, 1968).

Internal consistency alpha coefficient estimates for the entire instrument are .96 at the elementary school level, .97 at the middle school level, and .93 at the senior high school level; alpha coefficients for the seven school climate scales range from .67 to .96 (Butler & Alberg, 1990b). Test-retest reliability estimates for the dimensions, based on school-wide data after a four month interval, range from .61 to .78 (Kenney, 1993a).

Design and Procedure

A 2 X 2 multivariate analysis of covariance (MANCOVA) was employed using the seven *TSCI* dimensions as dependent variables to assess the impact of program participation and school level. A discriminant function analysis assessed the predictive capability of *TSCI* dimensions in differentiating experienced from beginner schools using current performance (spring 1993 data).

Schools were categorized as experienced if they had participated in at least four school climate audits. That is, they had participated in a baseline and at least three subsequent audits (three or more years of program activity). The beginner

schools constituted those institutions that had participated in two audits (i.e., only one year of actual program activity). To obtain relatively equal numbers of schools in each cell of the 2 X 2 design, middle and senior high schools were grouped together into a single category of school level which was then compared to an elementary category. Such an approach is statistically sound since elementary schools have been found to differ significantly from middle and senior high schools on all *TSCI* dimensions (Kenney, 1993b).

The *TSCI* scores used for this research were in the form of T-scores (mean = 50, standard deviation = 10). These standardized scores are linear transformations based on all baseline scores of 129 elementary, middle, and senior high schools, representing more than 4,300 respondents (Kenney, 1993b).

Results

MANCOVA

No interaction between experience and organizational level was detected, Wilks $\Lambda = .93$, $F(7,75) = .77$, $p = .618$. There was also no main effect for experience, Wilks $\Lambda = .88$, $F(7,75) = 1.50$, $p = .179$.

A main effect for school organizational level was found, Wilks $\Lambda = .75$, $F(7,75) = 3.59$, $p = .002$. Inspection of univariate F-ratios indicated that only the Instruction dimension was significantly influenced by this main effect, $F(1,81) = 5.25$, $p = .025$ (see Table 2). Elementary schools had larger increases in the perceived efficacy of instructional methods than did middle and senior high schools (see Figure 1). All changes in mean T-scores were ordinal. That is, Experienced schools had higher scores than Beginner schools on all dimensions (see Figure 2).

Table 2

School Climate T-scores by Program Experience and School Level

	Beginner			Experienced			Total		
School Level	Base	1993	Δ	Base	1993	Δ	Base	1993	Δ
Elementary									
Order	50.4	49.5	-0.9	51.9	55.0	3.1	51.1	52.3	1.2
Leadership	50.5	50.7	0.2	51.0	53.3	2.3	50.8	52.0	1.2
Environment	49.4	50.4	1.0	52.8	53.8	1.0	51.1	52.1	1.0
Involvement	50.2	52.1	1.9	50.4	54.3	3.9	50.3	53.2	2.9
Instruction	51.4	55.0	4.6	50.5	61.3	10.8	51.0	58.2	7.2
Expectations	50.7	51.4	0.7	51.8	56.7	4.9	51.3	53.5	2.6
Collaboration	49.4	51.6	1.2	52.4	55.3	2.9	50.9	53.5	2.6
Middle/Senior High									
Order	53.4	53.0	-0.4	50.6	51.7	1.1	51.6	52.2	0.6
Leadership	52.0	52.8	0.8	51.3	51.0	-0.3	51.6	51.7	0.1
Environment	52.4	53.8	1.4	52.7	55.0	2.3	52.6	54.5	1.9
Involvement	51.2	53.6	2.4	50.9	53.5	2.6	51.0	53.5	2.5
Instruction	53.5	55.2	1.7	51.3	55.3	4.0	52.2	55.3	3.1
Expectations	52.7	53.4	0.7	51.4	52.9	1.5	51.9	53.2	1.3
Collaboration	52.8	55.3	2.5	51.9	54.8	2.9	52.3	55.0	2.7
Total									
Order	51.6	50.9	-0.7	51.3	53.4	2.1	51.4	52.2	0.8
Leadership	51.1	51.5	0.4	51.2	52.2	1.0	51.1	51.8	0.7
Environment	50.6	51.7	1.1	52.8	54.4	1.6	51.8	53.1	1.3
Involvement	50.6	52.7	2.1	50.7	53.9	3.2	50.6	53.4	2.8
Instruction	52.2	55.1	2.9	50.9	58.3	7.4	51.5	56.8	5.3
Expectations	51.5	52.2	0.7	51.6	54.8	3.2	51.6	53.6	2.0
Collaboration	50.7	53.1	2.4	52.2	55.1	2.9	51.5	54.2	2.7

Note. Δ = change. Elementary Beginner, n = 26; Elementary Experienced, n = 25; Middle/Senior High Beginner, n = 17; Middle/Senior High Experienced, n = 24.

Figure 1

School Climate Instruction Dimension by School Level

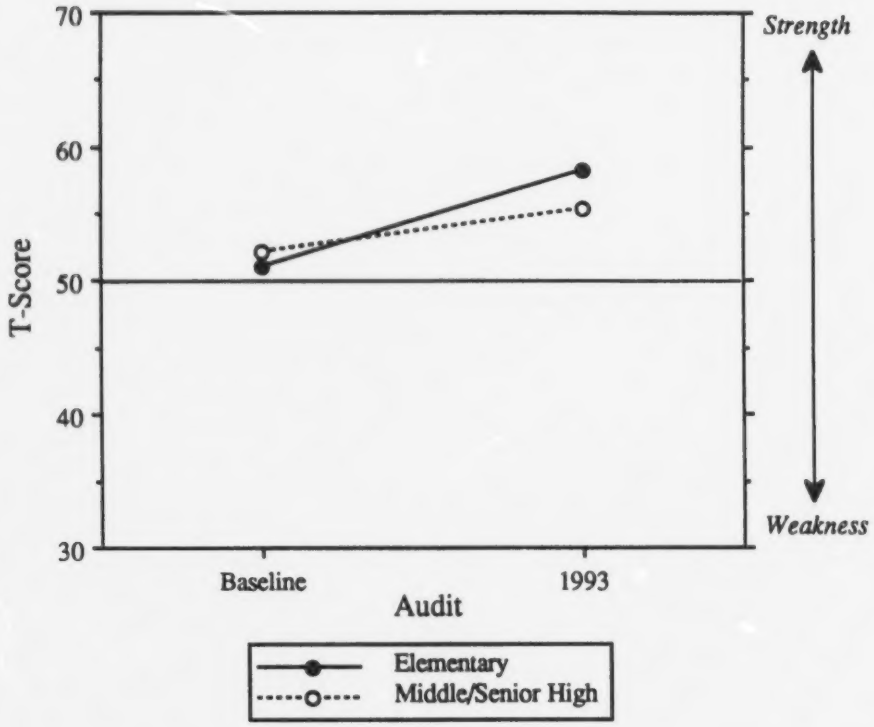
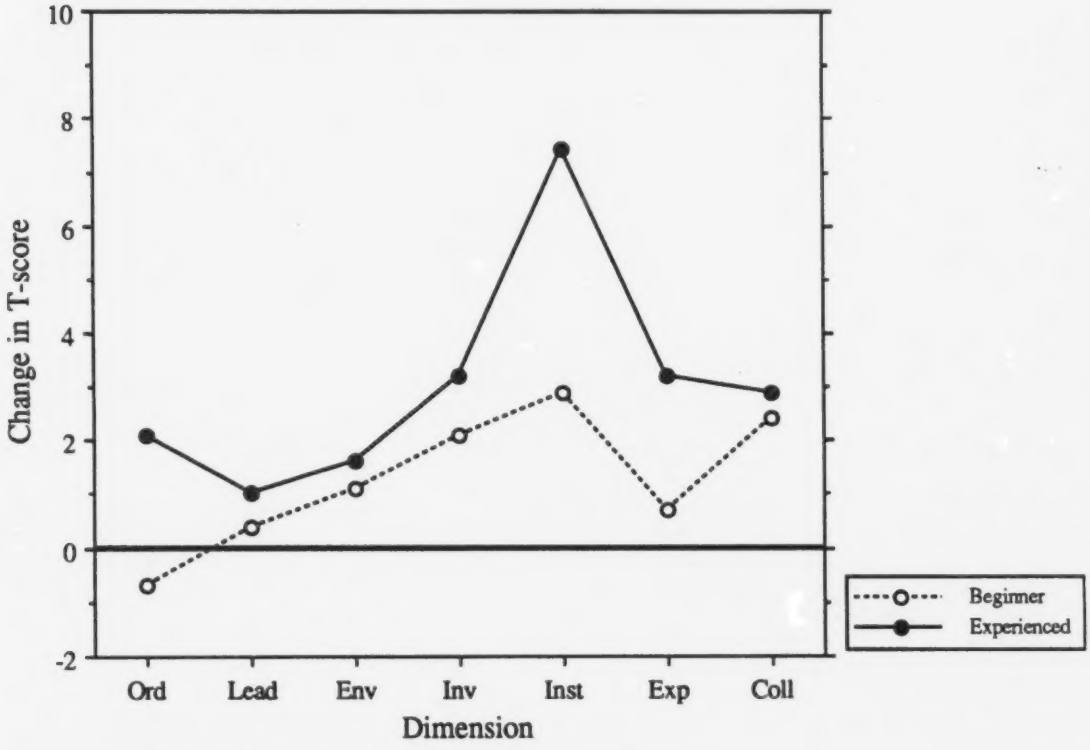


Figure 2

Changes in T-scores for Beginner and Experienced PATS Schools



Note. Beginner schools are schools with one year of program experience. Experienced schools have 3-4 years of experience.

Disciminant Analysis

The results of the discrimiant analysis are detailed in Table 3. Three dimensions were selected using Wilks' method, though as a combination these variables did not significantly discriminate Experienced from Beginner schools, Wilks $\Lambda = .95$, $F(1,3) = 1.65$, $p = .183$. The derived discriminant function correctly classified 60.9% of schools. The resultant canonical correlation between three selected dimensions (Leadership, Environment, and Instruction) and experience level (0 = Beginner, 1 = Experienced) was .23.

Discussion

This research investigated the relationship between school climate, PATS program experience, and school organizational level. No significant differences were found between experienced and beginner schools, nor was any interaction effect found for experience level and school level. School level was found to have a significant effect, with elementary schools improving more than middle and senior high schools, regardless of experience (i.e., time) in the program. In addition, current (spring 1993) *TSCI* dimensions were found to be relatively poor predictors of program experience level among the schools.

Several explanations may be proposed in light of these results. First, it may be concluded that the PATS program has no effect on improving school climate. On the surface, this conclusion seems reasonable since schools did not significantly improve scores over time in relation to particular starting points. Examination of the changes in scores, however, indicates that, with the exception of Order in the case of Beginner schools, all other dimensions showed net improvement over time

Table 3

Discriminant Function Coefficients of Three School Climate Dimensions for the Prediction of Experience Level

Step	Dimension	Unstandardized Coefficient	Standardized Coefficient	Wilks' Λ	*p*
1	Leadership	-0.145	-1.52	.977	.151
2	Environment	0.118	1.18	.962	.178
3	Instruction	0.078	0.85	.947	.183
	(Constant)	-3.150			

Note. Coefficients are based on Beginner = 0, Experienced = 1.

even among beginner schools. The data suggest that 61.5% of schools would be expected to improve school climate variables over a three- to four-year period, while only 38.5% of schools would be expected to improve over a one-year period. This fact would appear to provide some evidence for the positive impact of the PATS project on school climate dimensions.

A second explanation for the results may be the stability of school climates themselves. A review of the present data revealed moderate to high test-retest correlations, ranging from .43 to .83. Regardless of experience level, test-retest relationships remained stable, though elementary coefficients were somewhat higher than middle school and senior high coefficients (see Table 4).

This research suggests that changing school climate may be a long-term process. Schools with three to four years of experience trying to improve their respective school environments were not found to have improved (at least perceptually) any more than schools with one year of experience. However, experienced schools were more likely to have shown net improvement over time than beginner schools. The stability of school climates may be contributing to the lack of significant improvements. Future research in this area should focus on the resiliency of school climate and its effects on the process of reform.

While school cultures or climates seem to be inherently stable and resistant to change, the PATS project has demonstrated that they are subject to modification and improvement. PATS has also verified that successful strategies can be developed to structure and communicate information useful in highlighting and defining problem areas or issues in schools, not in designing remedies. These

Table 4

Test-Retest Coefficients by Experience Level and School Level

	Beginner	Experienced	Total
School Level	Range (Median)	Range (Median)	Range (Median)
Elementary	.63 to .78 (.72)	.57 to .80 (.70)	.57 to .80 (.71)
Middle/ Senior High	.43 to .83 (.50)	.45 to .78 (.61)	.43 to .83 (.60)
Total	.43 to .83 (.64)	.45 to .80 (.64)	.43 to .83 (.64)

Note. Elementary Beginner, n = 26; Elementary Experienced, n = 25; Middle/Senior High Beginner, n = 17; Middle/Senior High Experienced, n = 24.

results suggest that Tennessee is achieving success in addressing the difficulty of connecting information to inform practitioners in ways that will assist and motivate them to change their perspectives and practices. Moreover, the educational information system implemented in PATS demonstrates that measures of what goes on in schools is important information that can be used in discussions about how to improve schools as organizational entities. Other studies are currently being planned to determine if changes in school contexts and indicator systems produce changes in outcomes over time.

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